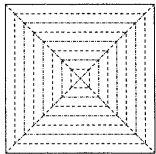


PRACTICAL CREATIVE GEOMETRY

Sara Hernández Bennaji
Prof. Živa Slavec

EXERCISE 1

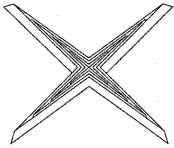
In this exercise we can see how a sheet can be used to create a parabola that touch the ground along an edge or at a corner, and then, through a progression of folded angles, rise upwards. This origami figure is an hyperbolic paraboloid. It can have more or less folds as seen in the picture.



Final crease pattern

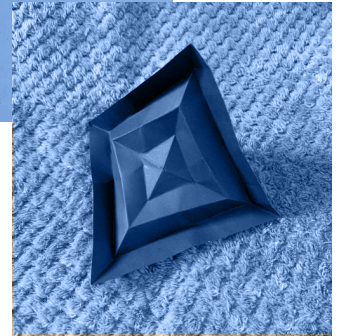
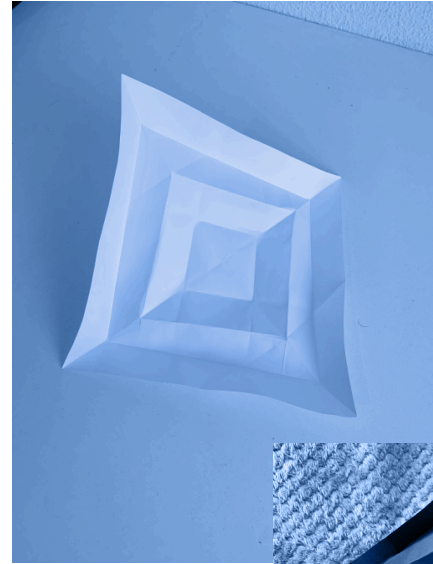
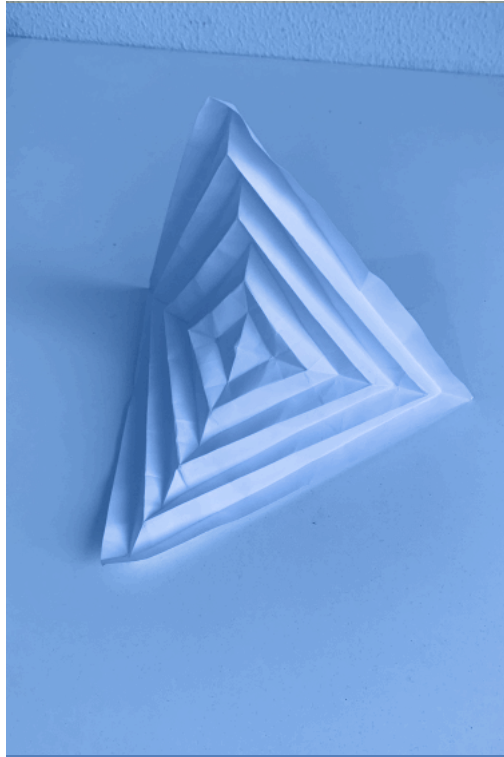
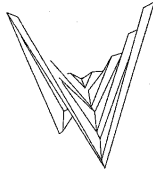
--- Valley fold

---- Mountain fold



Folding the crease pattern completely
forms an "X" shape

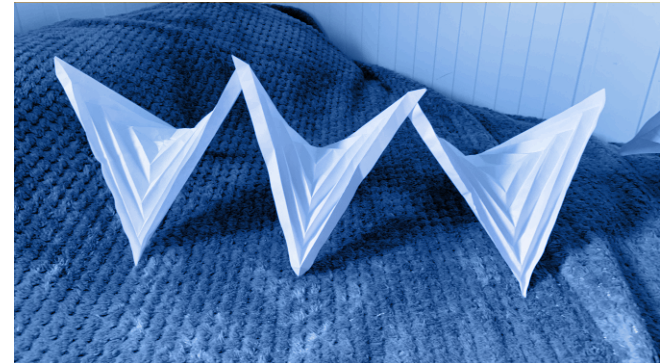
Partially opening it forms a hyper





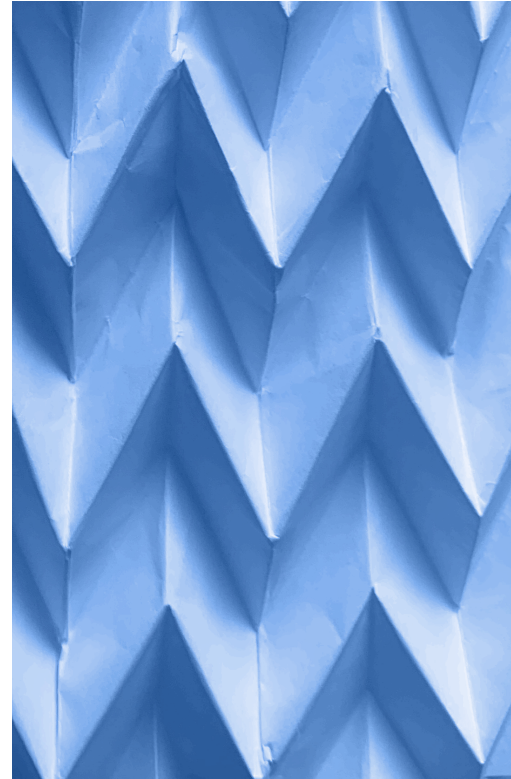
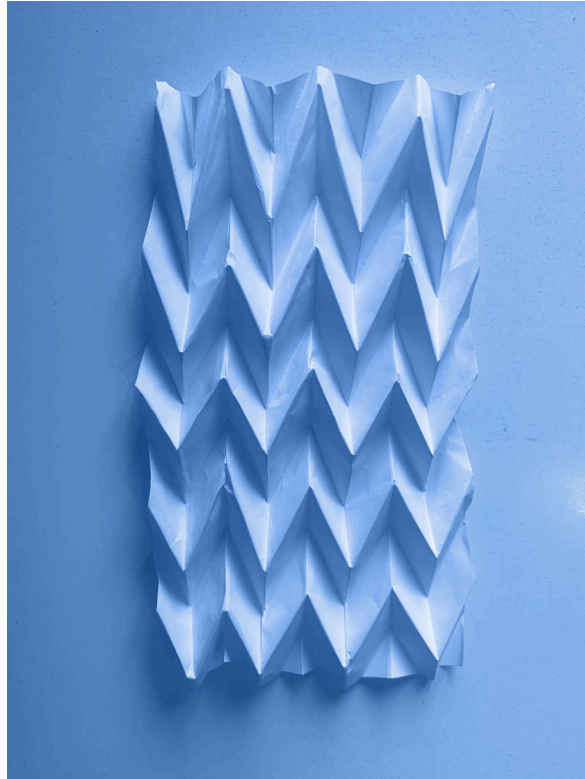
I arranged the pieces that I created to form this shape. We can see how the pieces create a structure that resembles a camping tent or festival tent where people would enter through the opening.

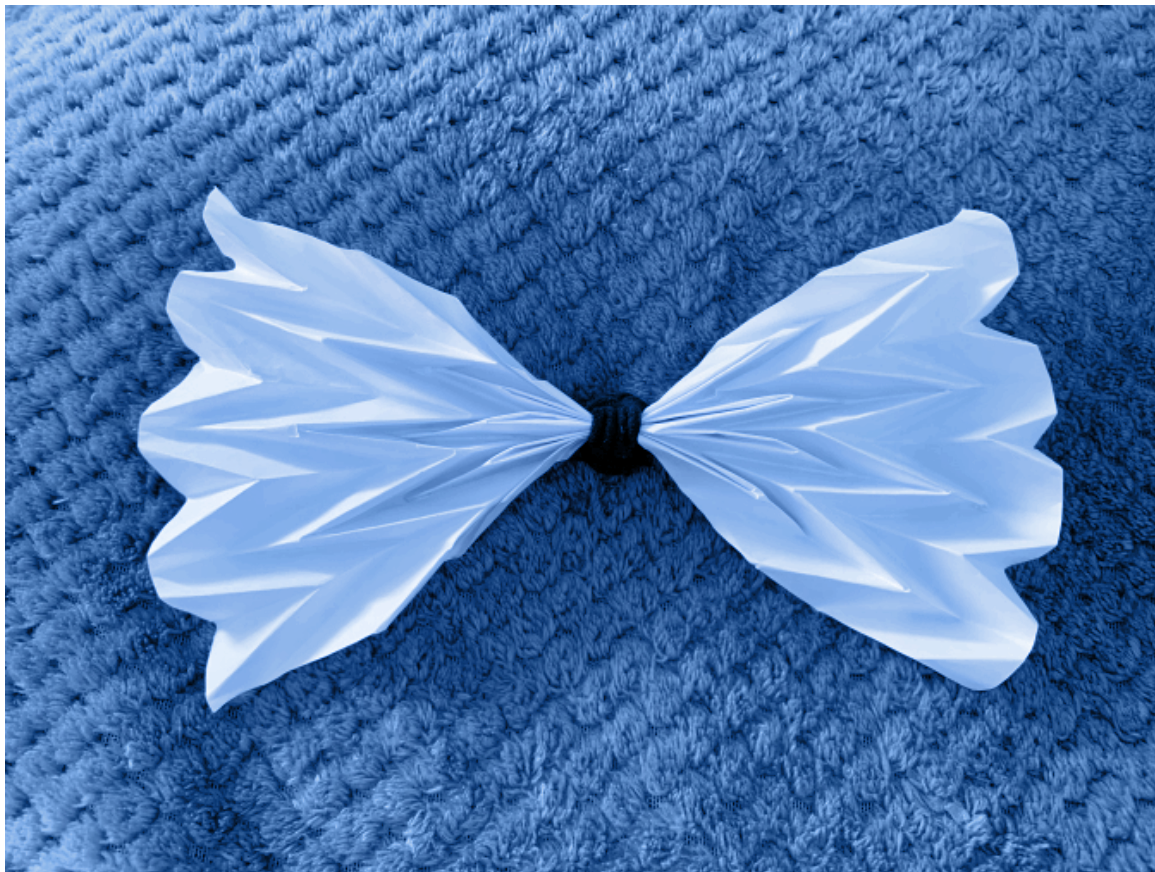
In the second picture I assembled the pieces trying to create a bridge or structure that could for example protect people that are walking from the sun rays.



EXERCISE 2

V-pleats are characterized by their distinctive 'V' shape. The Vs must alternate mountain-valley-mountain-valley along the line. Note, too, how the line of symmetry alternates between mountain and valley between successive pleats.

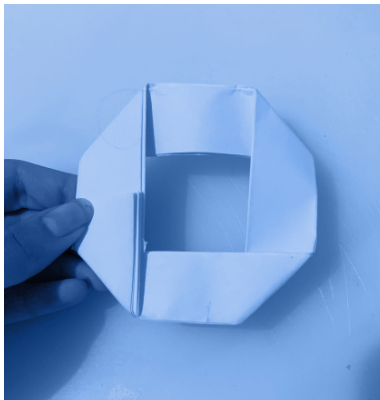




By joining the middle of the v-shaped sheet you can create a bow tie.



By making the pattern in a circular shape you can make a perfect structure for a flower pot or for a pencil holder. You can actually get a metal base and cover it with the paper/ cardboard structure as decoration.

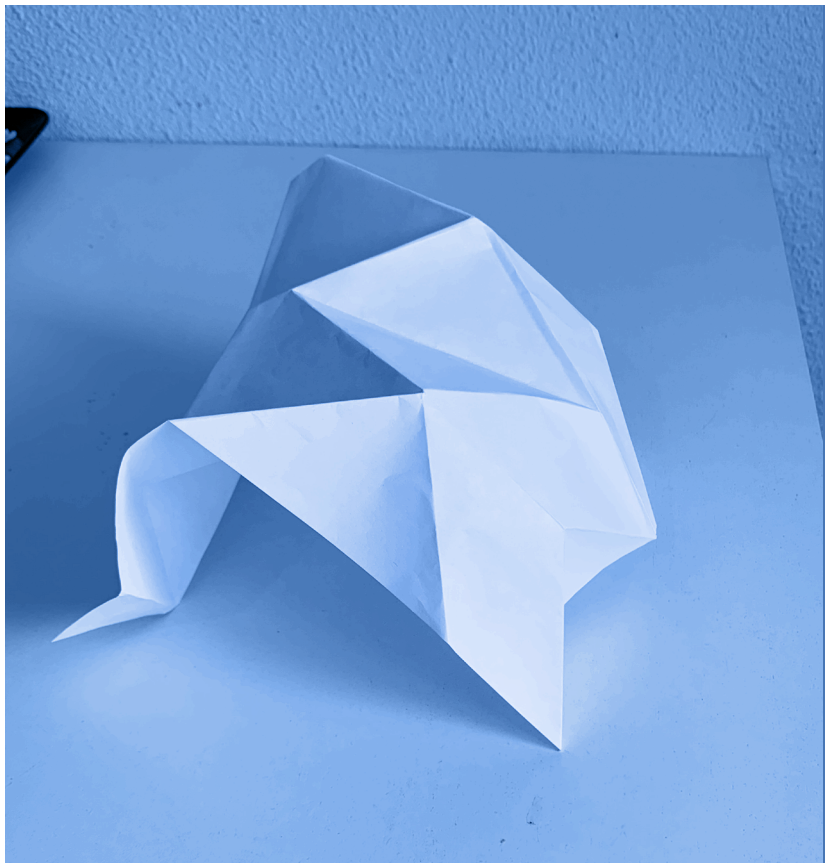




By changing the direction of the folds you can also create a bridge or tunnel shape.

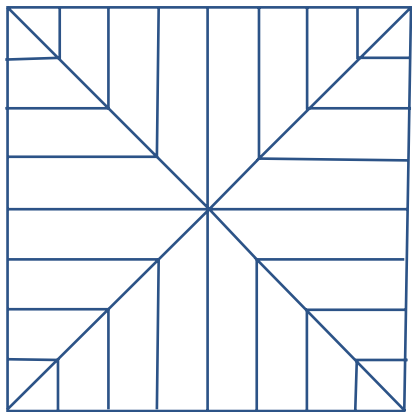
The paper folded this way can actually hold some weight so maybe with a stronger material it could work as the support for a stool or tiny table.





In this experimentation I folded the A4 in 3, that's why the triangle shapes are bigger than in the original pattern.

These are other variations I tried.

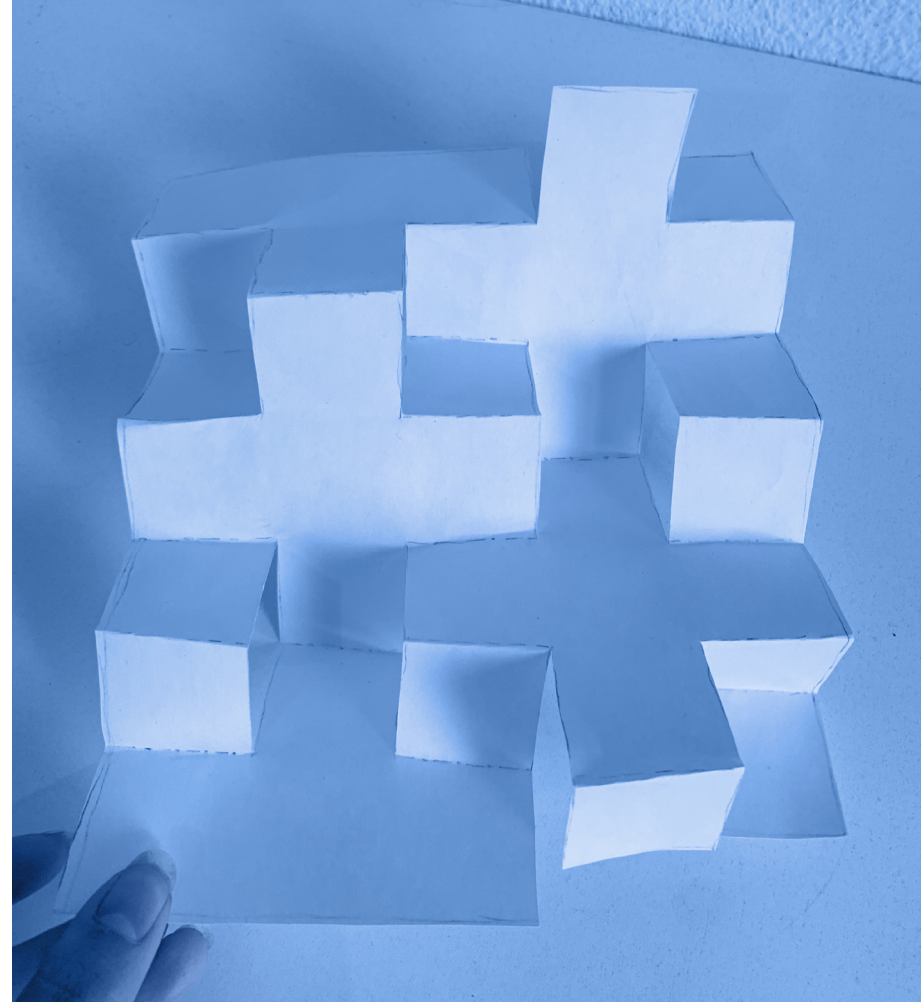


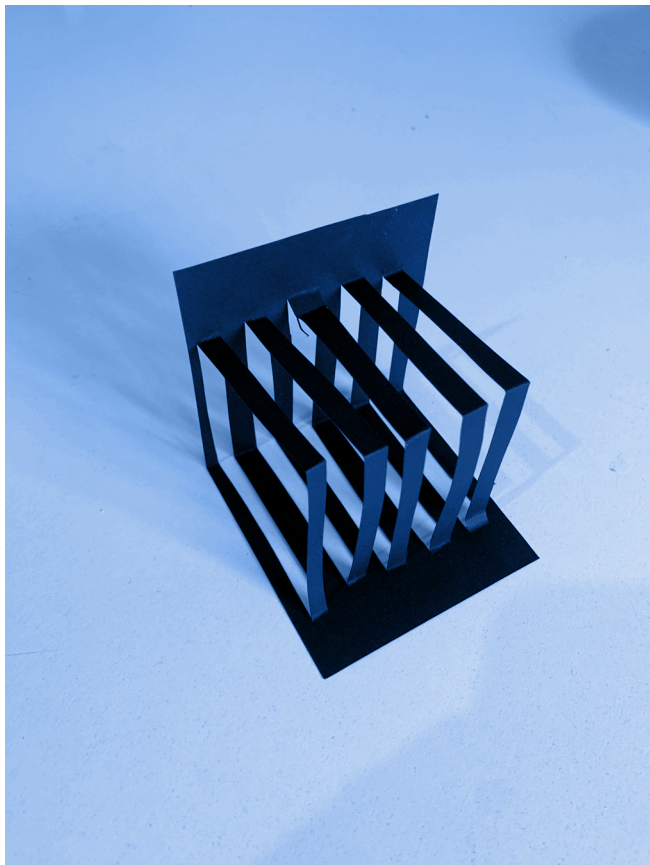


EXERCISE 3

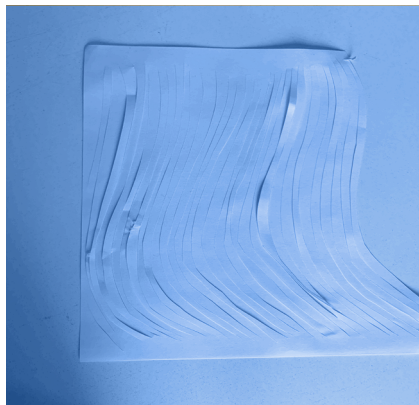
Kirigami is a form of paper art that involves cutting and folding paper to create intricate and three-dimensional designs.

In kirigami, the paper is not only folded but also strategically cut to achieve various shapes and patterns. The cuts allow the paper to be manipulated and expanded, resulting in more complex and dynamic designs compared to traditional origami.





With this experimentation I cut down some lines and folded them in opposite directions. With a harder material the structure could be used as a corner bathroom self for example.

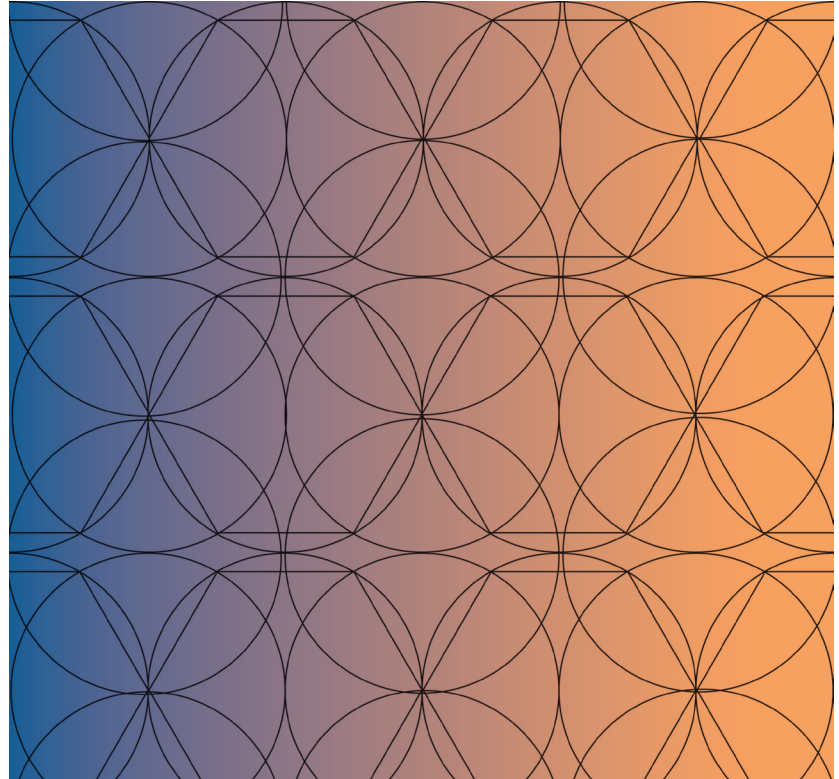


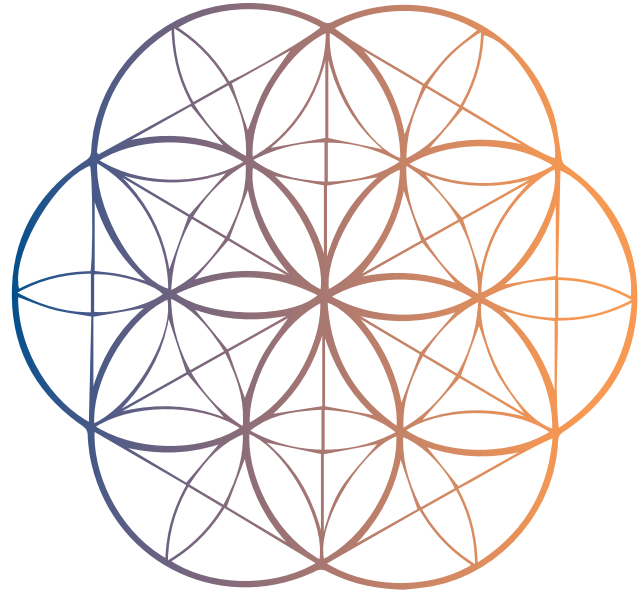
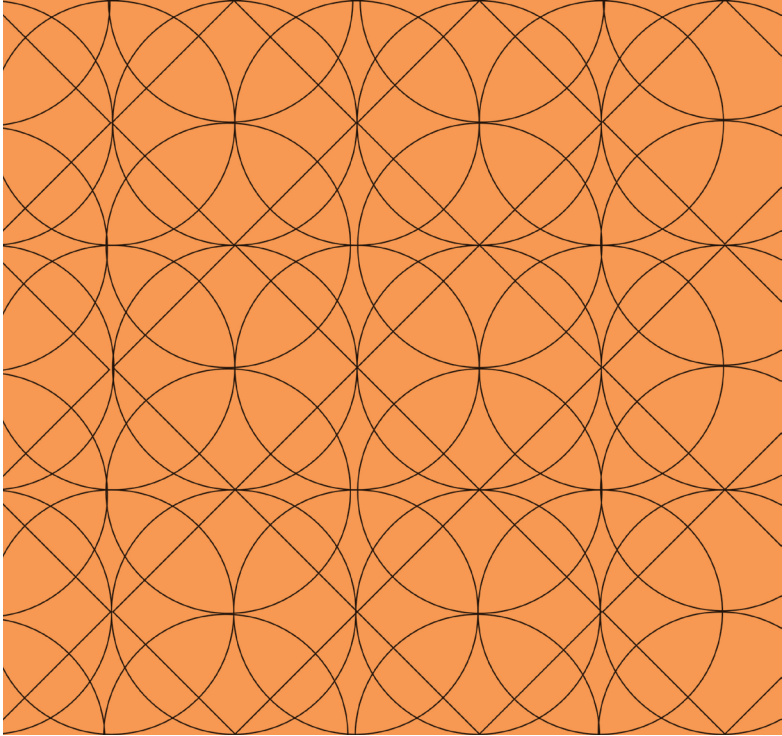
In this case I decided to make some kirigami shapes that could be used as lamp structures or even applied in the clothing industry in bracelets or wrist bands.

EXERCISE 4

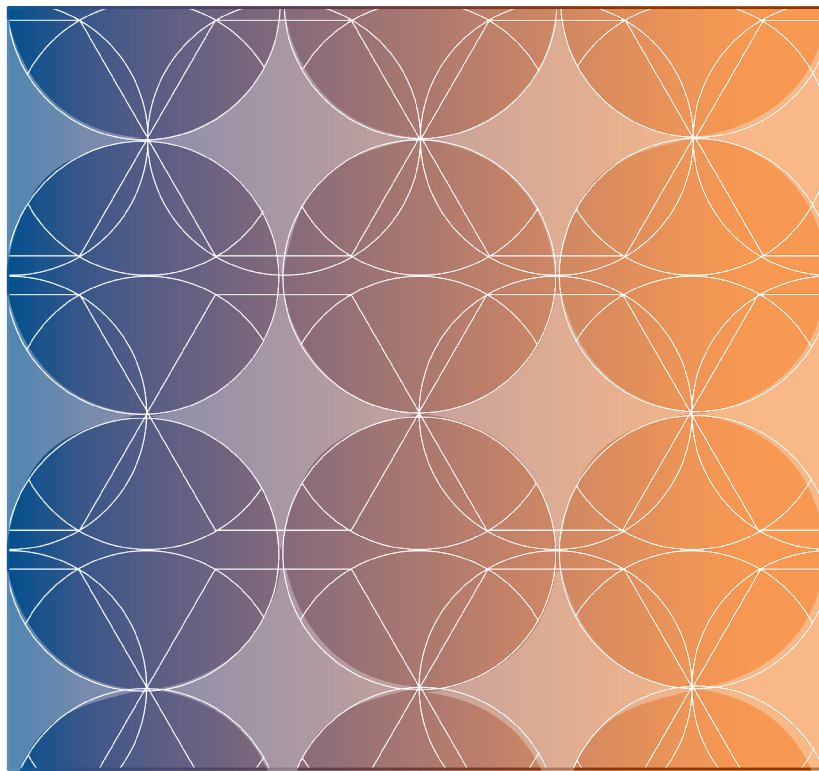
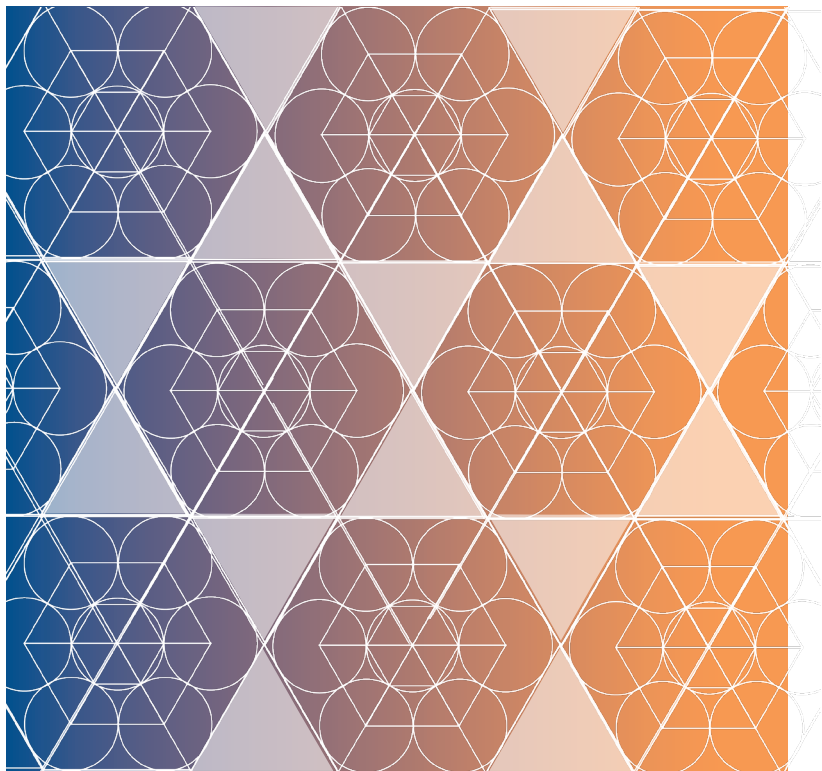
Euclidean geometry is a branch of mathematics that studies the properties and relationships of flat shapes and figures. It is based on a set of axioms and postulates established by Euclid.

Using Euclidean geometry, you can create various patterns, including tessellations, where shapes fit together without gaps or overlaps. Other patterns include geometric spirals, fractals, symmetrical designs, and intricate polyhedra.





SACRED GEOMETRY FLOWER



EXERCISE 5

Geometric figures are basic shapes that exist in geometry, such as points, lines, and polygons.

Polygons, like triangles and squares, are flat, closed figures with straight sides and defined angles.

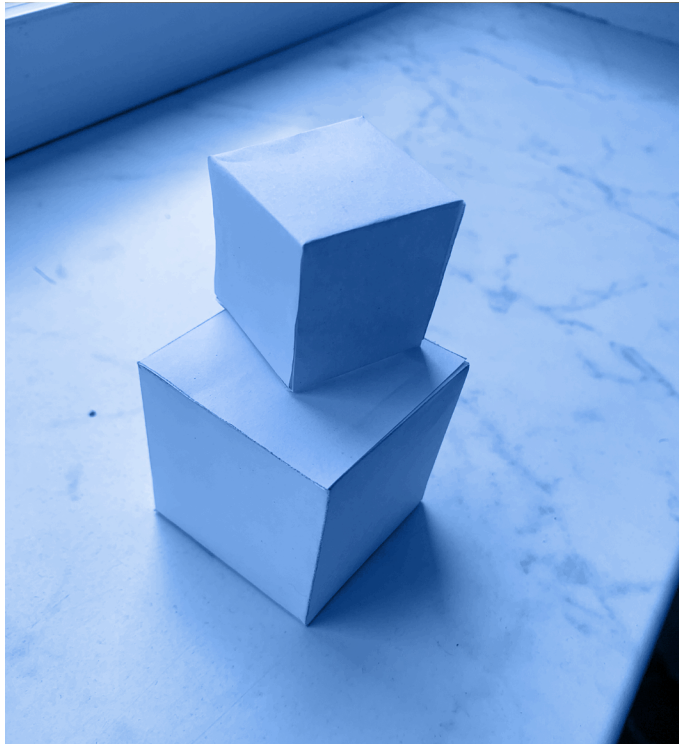
Geometric solids, also known as 3D shapes, include cubes, spheres, cylinders, cones, and pyramids.

These solids have volume, surface area, and distinct features like faces, edges, and vertices.

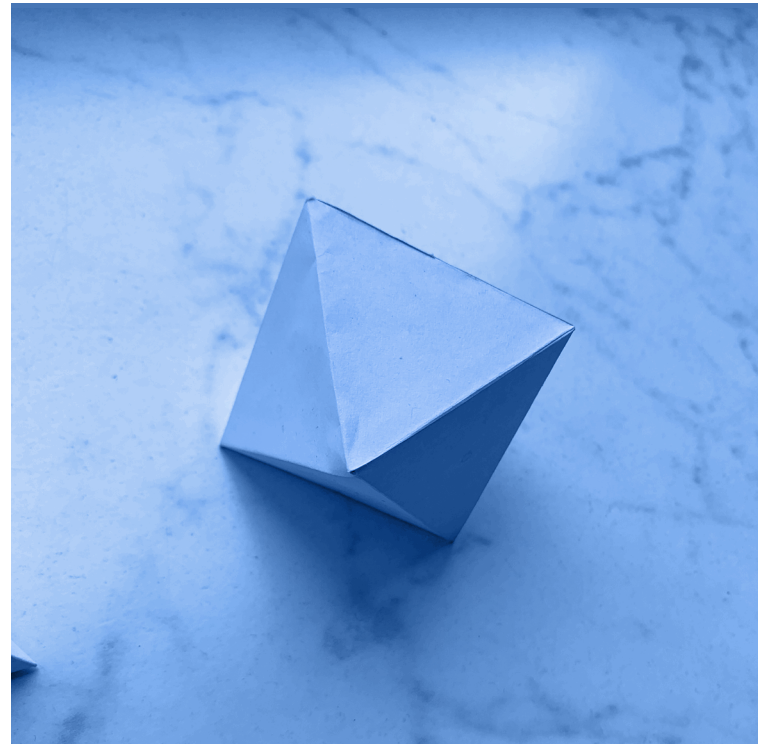


REGULAR
TETRAHEDRON

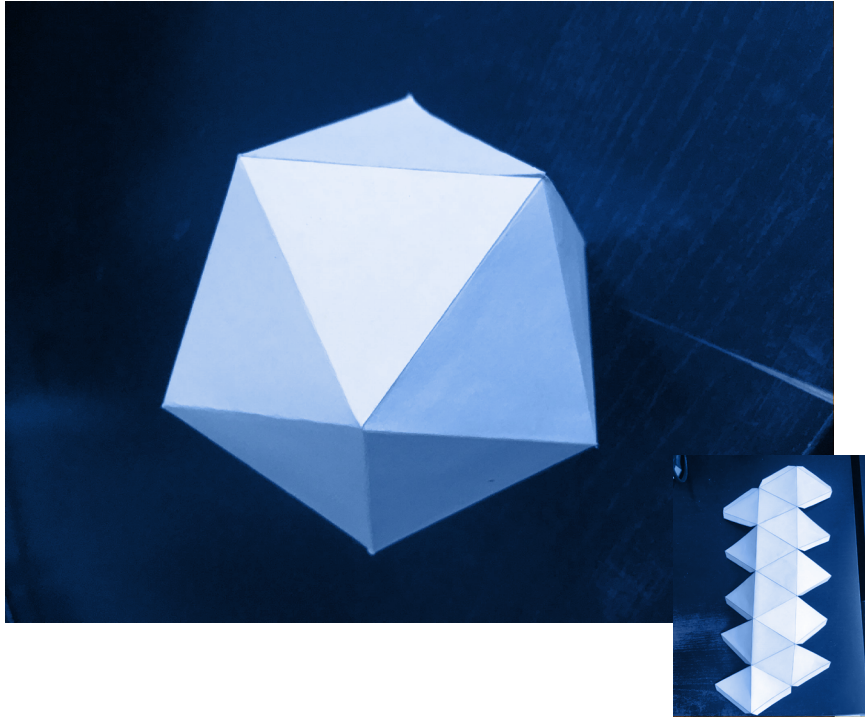
CUBE



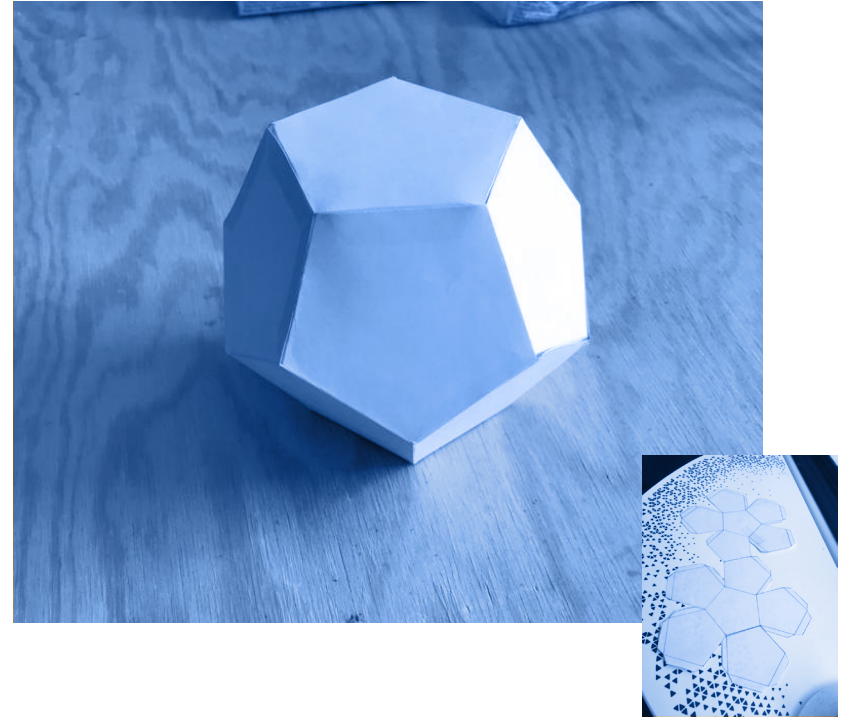
REGULAR OCTAHEDRON



REGULAR ICOSAHEDER



REGULAR DODEKAHEDRON

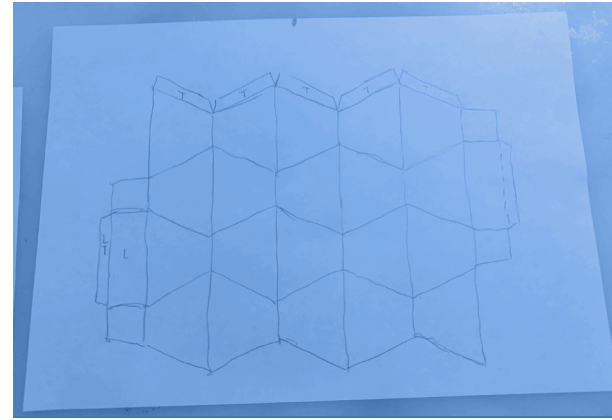


EXERCISE 6

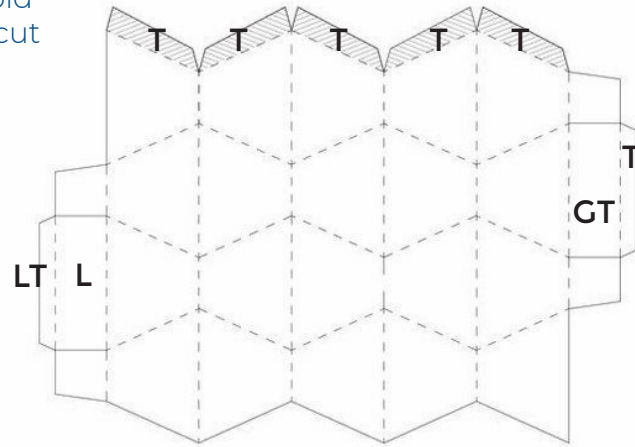
Structural design can be implemented in all fields of creative industry. Designing packages, furniture, textiles, all kinds of products.

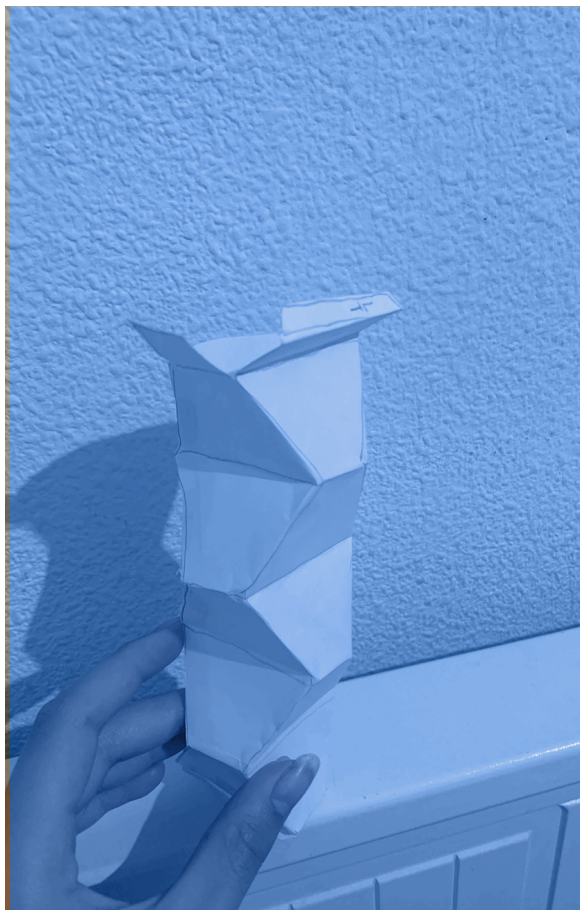
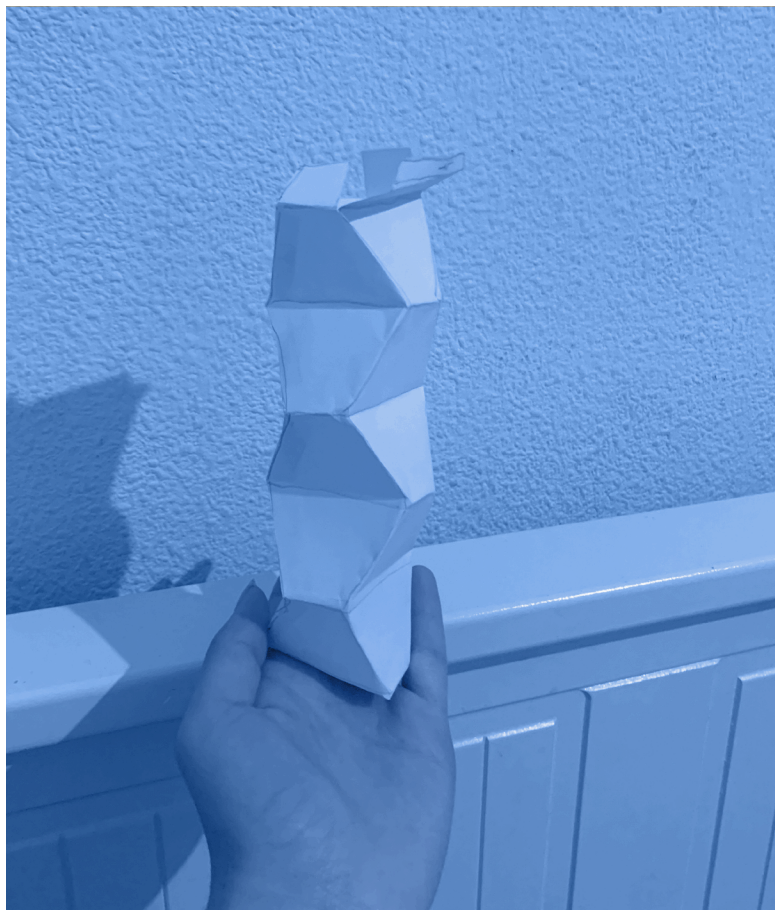
In this exercise we had to approach how to properly make a packaging with deformations.

I decided to do a zig zag packaging where some creases fold in and some out, forming valleys and mountains.



Dotted: fold
Straight: cut





FINAL WORKS

PACKAGING

This past semester I had a graphic design lecture where I could chose what project to do. I decided to combine the knowledge of this class with the other and I created a condom packaging, making sure the box had the proper lids and tabs and was of easy use for the customer.

First I looked at different condom packagings to get inspiration of the measurements that the box should be, considering depth, height and width. Also checking how to make the opening easy and accesible for the user.

Next, I made the stencil in Illustrator and printed it to do some tests. After several tries of changing some sizes I got the final version. I decided the edges would be round for a more pleasing and easier use of the packaging.

I cut and assembled the final version and it worked correctly. I took some pictures of the final result that are in the next slide.



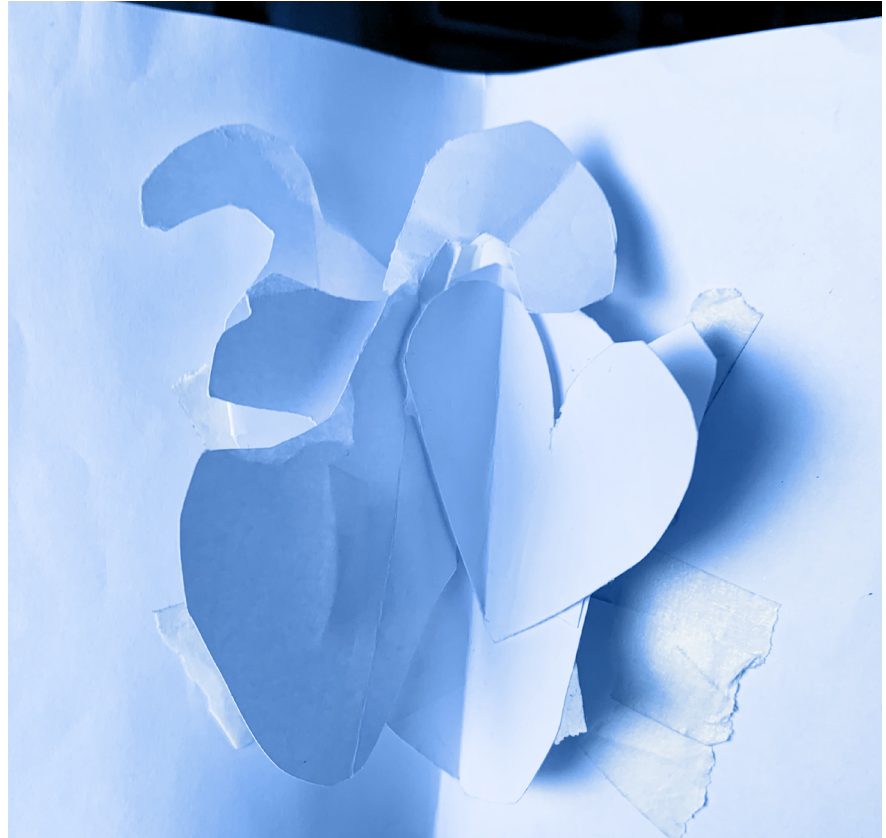


POP UP CARD

The purpose is to design a card that, when opened, presents a three-dimensional surprise or scene.

In this case, I initially decided to make a heart pop-up card that had different pieces. It acts as a symbol for love and could be used as a gift. In the image we can see a draft of it.

However, during the creative process, you decided to switch to a dragonfly design.



To create such a pop-up card, I started by sketching the dragonfly design, focusing on the wings and body. For that, I had to look at different reference pictures of dragonflies.

Then I started making a first draft of what the pop up would be like. In the process I had to determine the placement and structure of the pop-up mechanism to make the body and the head extend when the card is opened. Basically, the mechanism is a creased paper that tenses up when the card is open.

Then I had to draw in another paper some of the pieces that I would have to glue into the paper. One I had the pieces I cut them out and arranged them into the final card.

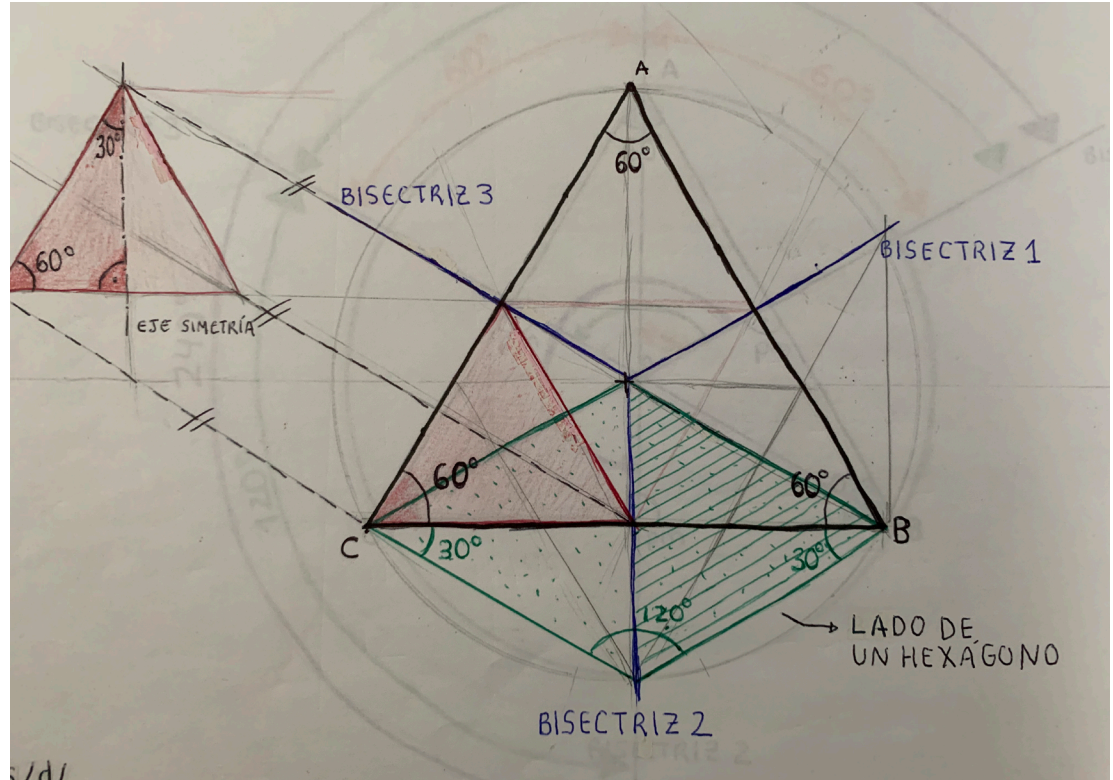
In the following slide there are pictures of the final result.

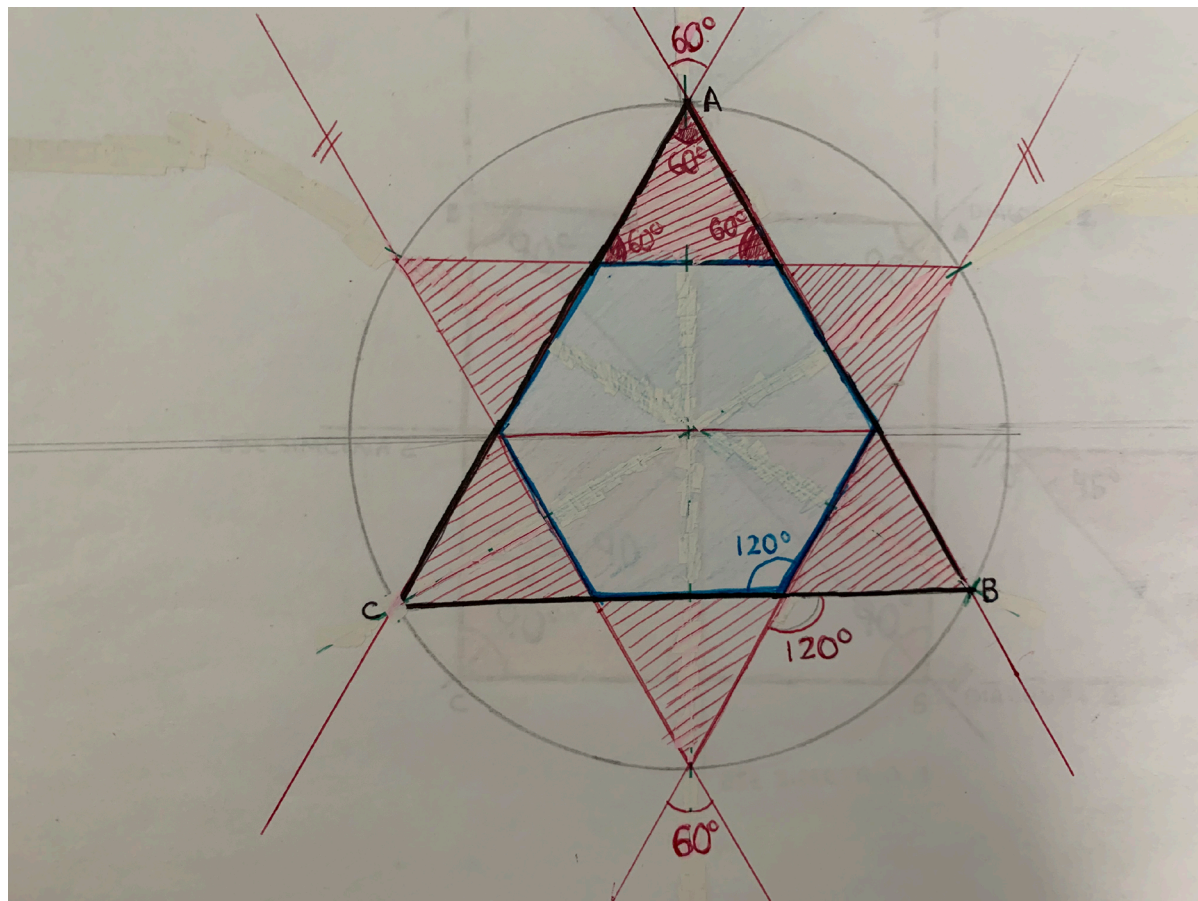


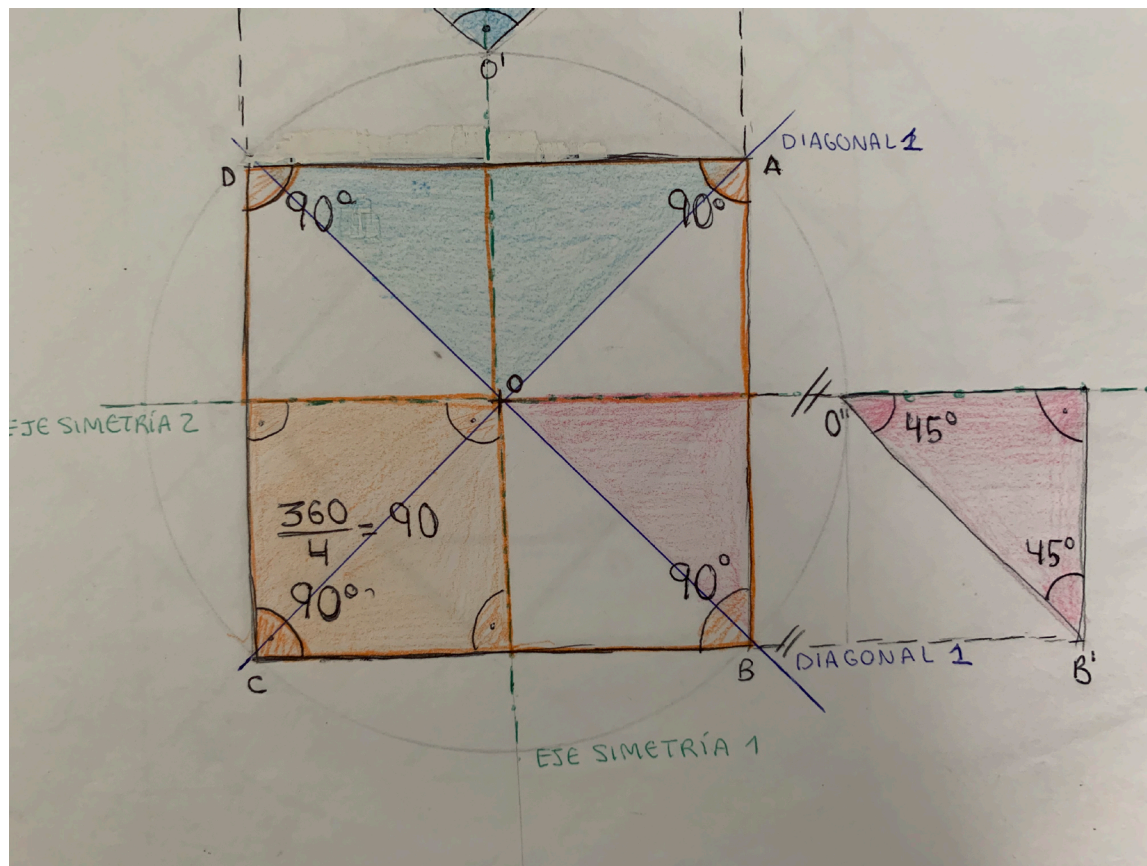


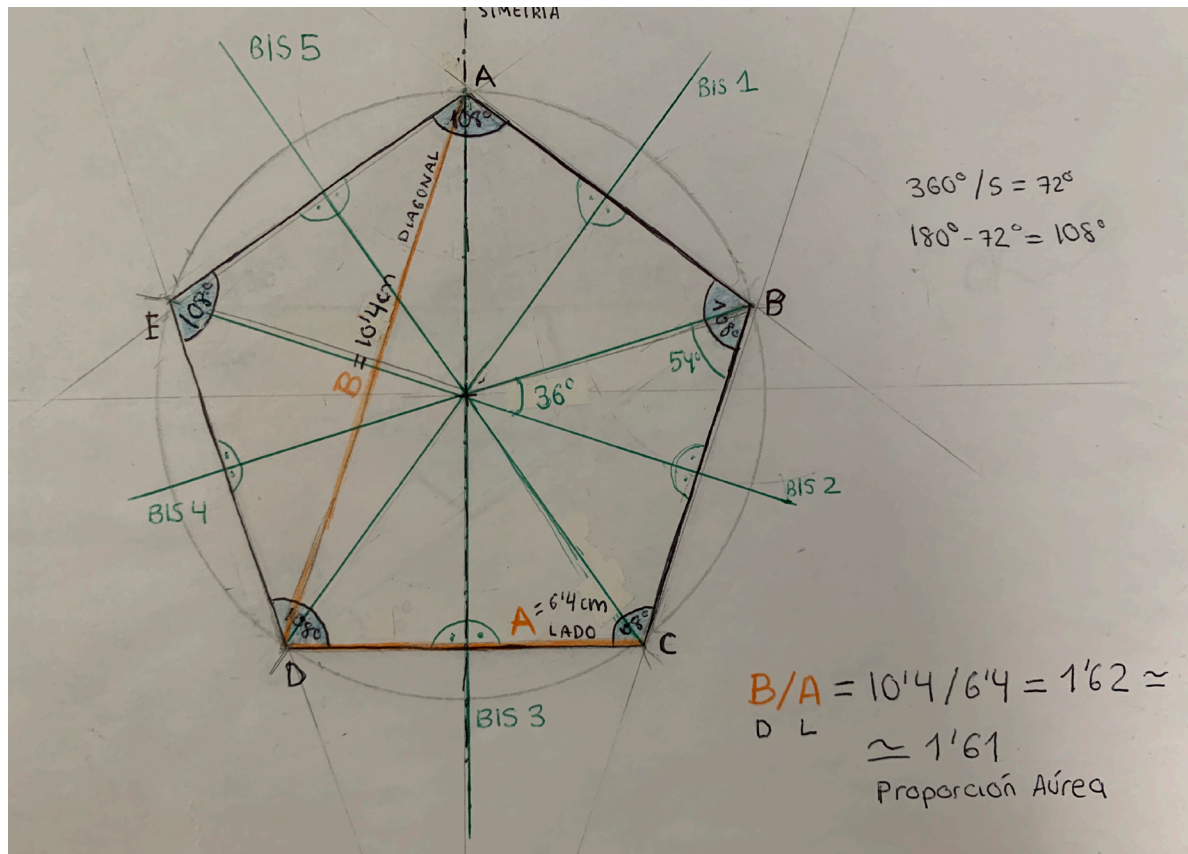
GEOMETRIC RELATIONS

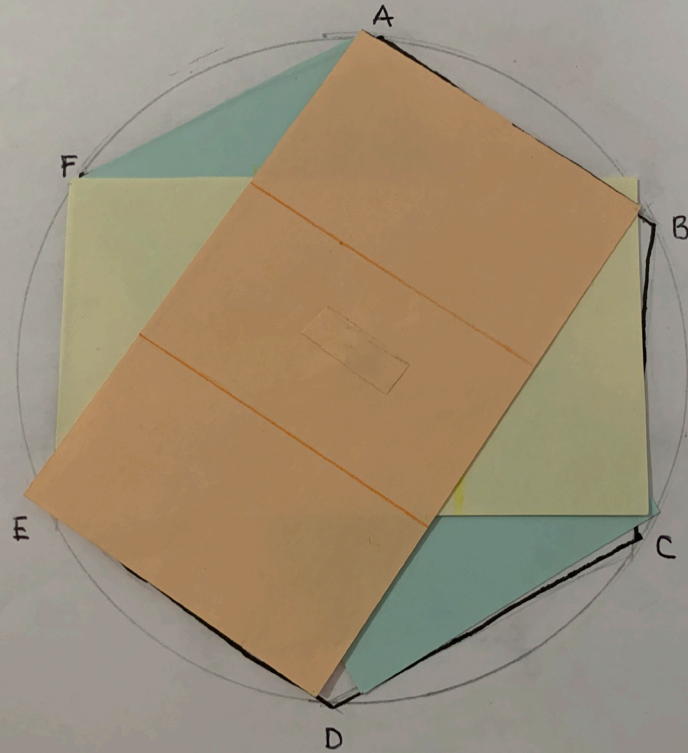
In class we discussed euclidean geometry and the different geomtric proportions we could find. I decided to look for the relations between different geometry shapes and how the proportions appear in different figures. Here are some of the drawings I made.











HEXÁGONO A PARTIR
DE RECTÁNGULOS
CÚBICOS
PROPORCIÓN $\sqrt{3}$